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KOREAN PATENT APPLICATION UNDER
SERIAL NO.: 35416/2003

FILED ON: June 20, 2003

IN THE NAME OF: LG Philips LCD Co., Ltd.

FOR: DISPENSER FOR LIQUID CRYSTAL DISPLAY PANEL

IN WITNESS WHEREOF, I SET MY HAND HERETO

THIS 27TH DAY OF MARCH, 2007

BY Lee Jong Sun

LEE, JONG SUN

[Translation]

PATENT APPLICATION

To : Director General
The Patent Office

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Date of Application : 2003. 6. 20

Classification for international patent : G02F 1/1339

Title of the Invention : DISPENSER FOR LIQUID CRYSTAL DISPLAY PANEL

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This application is hereby filed pursuant to Article 42 of the Patent Law.

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[Translation]

DISPENSER FOR LIQUID CRYSTAL DISPLAY PANEL

[Abstract]

A dispenser for a liquid crystal display panel is disclosed. Because a plurality of syringes are provided at each of a plurality of the dispensing units corresponding to the number of image display parts formed on the substrate, even if the number of the image display parts increases, seal patterns may be quickly formed, and even in the case of dropping liquid crystal or forming the Ag dot, the process may be promptly performed. In addition, because the plurality of syringes are provided at each of the plurality of dispensing units and fabricated to be movable corresponding to the size of a small liquid crystal display panel, seal patterns may be formed suitably corresponding to the size of the small liquid crystal display panel, and the dispenser may be also used for the case of dropping liquid crystal or forming the Ag dot on the small liquid crystal display panel.

[Representative drawing]

Figure 5

[SPECIFICATION]

[Title of the Invention]

DISPENSER FOR LIQUID CRYSTAL DISPLAY PANEL

[Brief description of the Drawings]

FIG. 1 is a plan view of the unit liquid crystal display panel formed by a thin film transistor array substrate and a color filter substrate according to the related art.

FIGs. 2a and 2b illustrate formation of a seal pattern through a screen printing method in accordance with the related art.

FIG. 3 illustrates formation of a seal pattern through a seal dispensing method in accordance with the related art.

FIG. 4 is an exemplary view showing a dispenser for a liquid crystal display panel in accordance with the related art.

FIG. 5 is an exemplary view showing a dispenser for a liquid crystal display panel in accordance with a preferred embodiment of the present invention.

FIG. 6 illustrates a sectional structure of one edge of the liquid crystal display panel.

**** Explanation for the major reference numerals ****

500 : substrate

510A~510F : image display parts

520 : support

530A~530C : dispensing unit

532A~532C : gap controller

540A~540F : seal pattern

531A,531B,531C,531D,531E,531G : syringe

[Detailed description of the invention]

[Object of the invention]

[Field of the invention and background art]

The present invention relates to a dispenser for a liquid crystal display panel and, more particularly, to a dispenser for a liquid crystal display panel capable of preventing mutual interference between adjacent dispensing units in performing a dispensing to a small liquid crystal display panel in a desired shape.

In general, a liquid crystal display is a display device where data signals that correspond to picture information are individually supplied to liquid crystal cells arranged in a matrix form. The light transmittance of each of the liquid crystal cells is controlled to display a desired picture.

The liquid crystal display device includes a liquid crystal display panel having liquid crystal display cells arranged in a matrix form and a drive integrated circuit (IC) for driving the liquid crystal cells.

The liquid crystal display panel also has a color filter substrate and a thin film transistor array substrate that face each other with a liquid crystal layer positioned between the color filter substrate and the thin film transistor array substrate.

Data lines and gate lines are formed on the thin film transistor array substrate of the liquid crystal display panel. These lines cross at right angles to thereby define liquid crystal cells adjacent to each of the crossings. The data lines transmit a data signal supplied from the data driver integrated circuit to the liquid crystal cells. The gate lines transmit a scan signal supplied from the gate driver integrated circuit to the liquid crystal cells.

The gate driver integrated circuit sequentially supplies scan signals to the gate lines so that the liquid crystal cells arranged in the matrix form can be sequentially selected line by line. A data signal is supplied to the selected one line of liquid crystal cells from the data driver integrated circuit.

A common electrode and a pixel electrode are respectively formed on the inner side of the color filter substrate and the thin film transistor array substrate. An electric field is applied across the liquid crystal layer via a common electrode and a pixel electrode.

More specifically, a pixel electrode is formed in each liquid crystal cell on the thin film transistor array substrate. The common electrode is integrally formed across the entire surface of the color filter substrate. Therefore, by controlling a voltage applied to the pixel electrode when a voltage is applied to the common electrode, light transmittance of the liquid crystal cells can be individually controlled. To control the voltage applied to the pixel electrode by liquid crystal cells, a thin film transistor used as a switching device is formed at each liquid crystal cell.

Elements of the liquid crystal display device will now be described.

FIG. 1 is a plan view of the unit liquid crystal display panel formed by a thin film transistor array substrate and a color filter substrate according to the related art.

As shown In FIG. 1, the liquid crystal display panel 100 includes an image display part 113 where the liquid crystal cells are arranged in a matrix form, a gate pad part 114 connected to the gate lines of the image display part 113, and a data pad part 115 connected to the data lines. The gate pad part 114 and the data pad part 115 are formed along an edge region of the thin film transistor array substrate 101 that does not overlap with the color filter substrate 102. The gate pad part 114 supplies a scan signal from the gate driver integrated circuit to the gate lines of the image display part 113, and the data pad part 115 supplies image information from the data driver integrated circuit to the data lines of the image display part 113.

Data lines to which image information is applied and gate lines to which a scan signal is applied are provided on the thin film transistor array substrate 101. The data lines and the gate lines intersect each other. Additionally, a thin film transistor for switching the

liquid crystal cells is provided at each intersection of the data lines and the gate lines. A pixel electrode for driving the liquid crystal cells connected to the thin film transistor is provided on the thin film transistor array substrate 101, and a passivation film protecting the pixel electrode and the thin film transistor is formed on the entire surface of the thin film transistor array substrate 101.

Color filters in the cell regions are separated by the black matrix. A common transparent electrode is provided on the color filter substrate 102. A cell gap is formed by a spacer between the thin film transistor array substrate 101 and the color filter substrate 102, which are attached to each other by a seal pattern 116 formed along an outer edge of the image display part 113.

In fabricating the liquid crystal display panel, a method for simultaneously forming a multiple liquid crystal display panels on a large-scale mother substrate is typically used. Thus, this method requires a process for separating the liquid crystal display panels from the large-scale mother substrate by cutting and processing the mother substrate having the plurality of liquid crystal display panels formed thereon.

After a liquid crystal display panel is separated from the large-scale mother substrate, liquid crystal is injected through a liquid crystal injection opening to form a liquid crystal layer in the cell-gap which separates the thin film transistor array substrate 101 and the color filter substrate 102, and then the liquid crystal injection opening is sealed.

To fabricate a liquid crystal display panel, the following processes are generally required. First, the thin film transistor array substrate 101 and the color filter substrate 102 are separately fabricated on the first and second mother substrates. The first and second mother substrates are attached in such a manner that a uniform cell-gap is maintained therebetween. The attached first and second mother substrates are cut into unit panels. Then, the liquid crystal is injected to the cell gap between the thin film transistor array

substrate 101 and the color filter substrate 102.

A process of forming the seal pattern 116 along an outer edge of the image display part 113 is required to attach the thin film transistor array substrate 101 and the color filter substrate 102. The related art seal pattern forming method will now be described.

FIGs. 2a and 2b illustrate a screen printing to form a seal pattern.

As shown in FIGs. 2a and 2b, there is provided a screen mask 206 patterned so that a seal pattern forming region is selectively exposed. And, a rubber squeegee 208 for selectively supplying a sealant 203 to the substrate 200 through the screen mask 206 is used to form the seal pattern 216. Thus, the seal pattern 216 is formed along an outer edge of the image display part 213 of the substrate 200, and a liquid crystal injection opening is formed at one side. The opening is for injecting liquid crystal into a gap between the thin film transistor array substrate 101 and the color filter substrate 102. The seal pattern 216 prevents the leakage of the liquid crystal.

In general, the screen printing method includes: applying the sealant 203 on the screen mask 206 having a seal pattern forming region patterned thereon, and forming the seal pattern 216 on the substrate 200 through printing with the rubber squeegee 208; and drying the seal pattern 216 by evaporating a solvent contained in the seal pattern 216 and leveling it.

The screen printing method is widely used because it has the advantage of processing ease. However, it has the disadvantage of sealant waste. More particularly, sealant is wasted because sealant is applied at the entire surface of the screen mask 206 and then the seal pattern is printed with the rubber squeegee 208 such that the excess sealant material, which is not printed, is thrown away. And in case of fabricating a large-scale liquid crystal display panel that requires a large substrate, sealant is more consumed

to increase a unit cost of the liquid crystal display device.

In addition, the screen printing method has another disadvantage in that a rubbed alignment layer (not shown) formed on the substrate 200 is degraded as a result of the screen mask 206 being brought into contact the substrate 200. The degradation of the rubbed alignment layer degrades picture quality of the liquid crystal display device.

Therefore, to overcome the shortcomings of the screen printing method, a seal dispensing method has been proposed.

FIG. 3 is an exemplary view of a dispensing method for forming a seal pattern in accordance with the related art.

As shown in FIG. 3, while a table 310 with a substrate 300 loaded thereon is being moved in forward/backward and left/right directions, a seal pattern 316 is formed along an outer edge of an image display part 410 of the substrate 300 by applying a certain pressure to sealant in a syringe 301.

In this seal dispensing method, since the sealant is selectively supplied to the region where the seal pattern 316 is to be formed, sealant consumption can be reduced. In addition, since the syringe is not in contact with the alignment layer (not shown) of the image display part 410 of the substrate 300, the rubbed alignment layer cannot be damaged and thus the picture quality of the liquid crystal display device is not degraded.

In case of forming the seal pattern 316 on the substrate 300 loaded on the table 310 by using the syringe 301, a technique is required to precisely controlling a gap between the substrate 300 and the syringe 301 is required.

That is, if the substrate 300 and the syringe 301 are too tightly attached compared to a desired gap, the seal pattern 316 formed on the substrate 300 widens and becomes low in its height. Conversely, if the substrate 300 and the syringe 301 are too much separated compared to the desired gap, the seal pattern 316 formed on the substrate 300 narrows and

there may be a broken part, to result in a defective liquid crystal display device.

In addition, if the sealant filled in the syringe 301 is completely used up, the seal pattern 316 would have a broken part or the seal pattern 316 would not be formed. In this case, the syringe should be replaced with another syringe 301 filled with the sealant before it is completely used up. At this time, however, the gap between the substrate 300 and the syringe 301 varies depending on a combination degree of the syringe 301, and thus, the gap between the substrate 300 and the syringe 301 should be newly set whenever the syringe 301 is replaced with a new one.

Replacement of the syringe 301 is frequently made in actual manufacturing of products. Therefore, a technique for setting the gap between the substrate 300 and the syringe 301 within a short time is also required.

In addition, simultaneous formation of the plurality of image display parts 410 on the substrate 300 can improve a yield of the liquid crystal display panel.

As shown in FIG. 4, in a related art dispenser for a liquid crystal display panel, a plurality of image display parts 410A~410F are formed on a substrate 400, and sealant is discharged from a plurality of dispensing units 430A~430C aligned and fixed at a support 420, to form a plurality of seal patterns 440A~440F along an outer edge of the image display parts 410A~420F formed on the substrate 400. The plurality of dispensing units 430A~430C respectively include syringes 431A~431C each having a nozzle at one end portion thereof to supply sealant to the substrate 400.

Though not shown on the drawing, the plurality of dispensing units 430A~430C individually include a gap controller to control a gap between the substrate 400 and the syringes 431A~431C.

Thus, the related art dispenser and dispensing method of the liquid crystal display panel has a problem that due to restriction of the space taken by the syringes 431A~431C

and the gap controllers 432A and 432C individually provided for the plurality of dispensing units 430A~430C, it is impossible to form the seal patterns 440A~440F for a small liquid crystal display panel.

In other words, if the liquid crystal display panel is small, the seal patterns 440A~440F can be hardly formed due to interference between the dispensing units 430A~430C respectively having the syringes 431A~431C and the gap controllers 432A~432C.

[Problem to be solved by the invention]

Therefore, an object of the present invention is to provide a dispenser for a liquid crystal display panel capable of preventing mutual interference between adjacent dispensing units in performing a dispensing on a small liquid crystal display panel.

[Construction of the invention]

To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided a dispenser for a liquid crystal display panel including: a substrate with a plurality of image display parts formed thereon; at least one dispensing unit for supplying a dispensing material on the substrate; at least one support for aligning and fixing the dispensing unit; and a plurality of syringes separately formed at the dispensing unit.

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

FIG. 5 is an exemplary view showing a dispenser for a liquid crystal display panel in accordance with a preferred embodiment of the present invention.

With reference to FIG. 5, a dispenser for a liquid crystal display panel includes a

substrate 500 with a plurality of image display parts 510A~510F formed thereon, a plurality of dispensing units 530A~530C for supplying sealant to the substrate 500 to simultaneously form a plurality of seal patterns 540A~540F along each outer edge of the plurality of image display parts 510A~510F, and a support 520 for aligning and fixing the plurality of dispensing units 530A~530C.

The plurality of dispensing units 530A~530C respectively include two syringes (531A and 531B), (531C and 531D) and (531E and 531F) each having a nozzle at one end portion thereof to supply sealant to the substrate 500.

Though not shown on the drawing, the plurality of dispensing units 530A~530C respectively include a gap controller for controlling a gap between the substrate 500 and the syringes (531A and 531B), (531C and 531D) and (531E and 531F).

The substrate 500 may be a first large-scale mother substrate made of glass on which a plurality of thin film transistor array substrates are formed, or a second large-scale mother substrate made of glass on which a plurality of color filter substrates are formed.

The syringes (531A and 531B), (531C and 531D) and (531E and 531F) provided two by two at the plurality of dispensing units 530A~530C supply sealant through each nozzle formed at each one end portion thereof to form the plurality of seal patterns 540A~540F along each outer edge of the plurality of image display parts 510A~510F formed on the substrate 500.

The syringes (531A and 531B), (531C and 531D) and (531E and 531F) correspond to the number of image display parts 510A~510F formed on the substrate 500, and two or plural syringes may be provided at the plurality of dispensing units 530A~530C.

For example, if nine image display parts are formed on the substrate 500, three syringes could be provided at each of the plurality of dispensing units 530A~530C.

The plurality of syringes (531A and 531B), (531C and 531D) and (531E and

531F) respectively provided by twos or plural ones at the plurality of dispensing units 530A~530C may be fabricated to be movable at least at one direction of the plurality of dispensing units 530A~530C in order to suitably correspond to the size of the plurality of image display parts 510A~510F formed on the substrate 500.

Or, at least one syringe may be fixed at the plurality of dispensing units 530A~530C and aligned together with the plurality of dispensing units 530A~530C at the support 520, and the other syringes may be formed to be movable at least at one direction of the plurality of dispensing units 530A~530C in order to suitably correspond to the size of the plurality of image display parts 510A~510F formed on the substrate 500.

As mentioned above, in the dispenser for the liquid crystal display panel in accordance with the present invention, since the plurality of syringes are provided at the plurality of dispensing units corresponding to the number of image display parts formed on the substrate, even if the number of image display parts formed on the substrate is increased, seal patterns may be promptly formed along each outer edge of the image display parts, thereby improving productivity.

In addition, since the plurality of syringes are provided at the plurality of dispensing units, seal patterns may be formed even in case of fabricating a small liquid crystal display panel.

In other words, referring back to the related art, if the liquid crystal display panel is small, since syringes and gap controllers are individually provided at each of the plurality of dispensing units, seal patterns may be hardly formed due to the mutual interference between dispensing units.

In comparison, however, in the present invention, the plurality of syringes are respectively formed at the plurality of dispensing units and fabricated to be movable corresponding to the size of the small liquid crystal display panel, so that seal patterns may

be formed along each outer edge of the plurality of image display parts suitably corresponding to the size of the small liquid crystal display panel.

The seal patterns formed by the dispenser for the liquid crystal display panel in accordance with the present invention may be varied in their forms according to methods for forming a liquid crystal layer on the liquid crystal display panel.

The method for forming the liquid crystal layer on the liquid crystal display panel is roughly divided into a vacuum injection method and a dropping method.

First, the vacuum injection method is done using a liquid crystal injection opening of a unit liquid crystal display panel separated from a large-scale mother substrate, that is put in a container filled with a liquid crystal in a chamber in which a certain vacuum is set. Then, liquid crystal is injected into the liquid crystal display panel according to a pressure difference between an inner side and an outer side of the liquid crystal display panel by varying a vacuum degree. After the liquid crystal is filled in the liquid crystal display panel, the liquid crystal injection opening is sealed to form the liquid crystal layer of the liquid crystal display panel.

The liquid crystal injection opening is defined as a region opened at one side of each seal pattern. Accordingly, in the case of forming the liquid crystal layer on the liquid crystal display panel through the vacuum injection method, one portion of each seal pattern must be opened to function as the liquid crystal injection opening.

The vacuum injection method as described above has the following problems.

First, it takes a long time to fill the liquid crystal into the liquid crystal display panel. In general, the attached liquid crystal display panel with an area of several hundreds cm^2 has a gap of a few μ ms (micrometers). Thus, even with the vacuum injection method, which uses pressure difference, the injection of liquid crystal takes a long time. For instance, in the case of fabricating a liquid crystal display panel of about 15 inches, it takes

8 hours to fill the liquid crystal display panel with liquid crystal. Thus, because such a long time is taken during the fabrication of the liquid crystal display panel, the productivity is degraded. In addition, as the liquid crystal display panel increases in size, the time required for filling liquid crystal correspondingly increases and thus filling deficiency of liquid crystal further occurs. Therefore, the vacuum injection method can hardly cope with the large-scale liquid crystal display panel.

Another problem with the vacuum injection method is that too much liquid crystal is consumed. In general, the actually injected quantity of liquid crystal in the vacuum injection method is very small compared to the quantity of liquid crystal filled in the container. When liquid crystal is exposed in the air or to a specific gas, it reacts with the gas and degrades. Thus, even if liquid crystal in a container is filled into a plurality of liquid crystal display panels. A large quantity of liquid crystal remaining after the filling has to be discarded, which increases the overall unit price of the liquid crystal display and thus decreases price competitiveness.

In order to overcome such problems of the vacuum injection method, a dropping method is proposed.

The dropping method is that liquid crystal is dropped and dispensed on a plurality of thin film transistor array substrates fabricated on a first large-scale mother substrate or on color filter substrates fabricated on a second large-scale mother substrate. The first and second mother substrates are then attached to each other so that liquid crystal is uniformly distributed at the entire image display regions by the attaching pressure, thereby forming a liquid crystal layer.

In other words, in the case of forming the liquid crystal layer on the liquid crystal display panel through the dropping method, since liquid crystal is directly dropped on the substrate, rather than being filled from an external source, seal patterns may be formed in a

closed pattern encompassing the image display parts in order to prevent leakage of liquid crystal to outside of the image display parts.

In the dropping method, liquid crystal may be dropped within a short time compared to the vacuum injection method, and even though the liquid crystal display panel is large in size, the liquid crystal layer may be quickly formed.

In addition, since only enough liquid crystal is dropped as required, the increase in the unit price of the liquid crystal display panel as in the vacuum injection method due to the expensive liquid crystal being discharged is prevented such that price competitiveness is increased.

Unlike the vacuum injection method, in the dropping method, after the liquid crystal layer is formed, the first large-scale mother substrate on which the plurality of thin film transistor array substrates are formed and the second large-scale mother substrate on which the plurality of color filter substrates are formed are attached and then unit liquid crystal display panels are separated from the large-scale mother substrates.

In the case of adopting the dropping method, if the seal patterns are formed with thermosetting sealant, the sealant may flow out while being heated during the follow-up process of attaching the liquid crystal display panel, contaminating the dropped liquid crystal. Thus, in order to avoid such a problem, the seal patterns are preferably formed with an ultraviolet (UV)-hardening sealant, or a mixture of the UV-hardening sealant and the thermosetting sealant may be applied.

The dispenser for a liquid crystal display panel in accordance with the present invention may be not only applied to formation of seal patterns on the substrate by filling it with sealant but also applied to dropping liquid crystal on the substrate through the dropping method as described above.

Namely, the plurality of syringes provided respectively at each of the dispensing

units corresponding to the plurality of image display parts formed on the substrate are filled with liquid crystal and liquid crystal is dropped to the plurality of image display parts through each nozzle provided at one end portion of the syringes.

As mentioned above, in the case of dropping liquid crystal by using the dispenser for the liquid crystal display panel of the present invention, since the plurality of syringes are respectively provided at the plurality of dispensing units corresponding to the number of image display parts formed on the substrate, even if the number of image display parts increases, liquid crystal may be quickly dropped on the image display parts, so that productivity may be enhanced.

In addition, since the plurality of syringes are respectively provided at the plurality of dispensing units and movable corresponding to the size of the small liquid crystal display panel, liquid crystal may be dropped to the plurality of image display parts suitably corresponding to the size of the small liquid crystal display panel.

In another embodiment, an Ag (Silver) dot may be formed on the substrate by using the dispenser for a liquid crystal display panel in accordance with the present invention.

The Ag dot will now be described with reference to FIG. 6.

FIG. 6 illustrates a sectional structure of one edge of the liquid crystal display panel.

With reference to FIG. 6, a liquid crystal display panel is formed such that a thin film transistor array substrate 601 and a color filter substrate 602 are attached in a facing manner with a certain gap by a spacer 603 and a seal pattern 605. A liquid crystal layer 605 is formed in the gap between the thin film transistor array substrate 601 and the color filter substrate 602.

The thin film transistor array substrate 601 is formed having a protruded portion

as compared to the color filter substrate 502, and at the protruded portion, a gate pad part connected to gate lines of the thin film transistor array substrate 601 and a data pad part connected to data lines are formed.

In the image display part of the thin film transistor array substrate 601, gate lines to which a scan signal is applied from outside through the gate pad part and data lines to which image information is applied through the data pad part are arranged to cross each other, and a plurality of thin film transistors for switching the liquid crystal cells is formed at each of the crossings of the gate lines and the data lines.

In addition, a plurality of pixel electrodes connected to the thin film transistors are separately formed at cell regions.

In the image display part of the color filter substrate 602, color filters are formed in each of the cell regions that are separated by a black matrix.

A common transparent electrode for driving the liquid crystal layer together with the pixel electrodes formed on the thin film transistor array substrate 601 is also formed on the color filter substrate 602.

A common voltage line 607 for applying a common voltage to the common electrode 606 formed on the color filter substrate 602 is formed on the thin film transistor array substrate 601.

An Ag dot 608 is formed either on the thin film transistor array substrate 601 or the color filter substrate 602 to electrically connect the common voltage line 607 and the common electrode 606, so that the common voltage applied to the common voltage line 607 may be applied to the common electrode 606 by way of the Ag dot 608.

At least one or more Ag dots 608 are formed at each of the plurality of unit liquid crystal display panels fabricated on the large-scale mother substrate, which may be formed by using the dispenser in accordance with embodiments of the present invention.

Namely, after the plurality of syringes respectively provided at the plurality of dispensing units that correspond to the plurality of image display parts formed on the substrate are filled with Ag, Ag is discharge at each outer edge of the plurality of image display parts through each nozzle provided at one end portions of syringes, thereby forming the Ag dot 608.

As mentioned above, also in the case of forming the Ag dot 608 by using the dispenser for the liquid crystal display panel in accordance with the present invention, the plurality of syringes are provided at the plurality of dispensing units corresponding to the number of the plurality of image display parts formed on the substrate. Thus, even if the number of image display parts formed on the substrate increases, the Ag dot 608 may be quickly formed on each outer edge of the image display parts, thereby improving productivity.

In addition, since the plurality of syringes are provided at the plurality of dispensing units and fabricated to be movable corresponding to the size of the small liquid crystal display panel, the Ag dot 608 may be formed at each outer edge of the plurality of image display parts suitably corresponding to the size of the small liquid crystal display panel.

[Effect of the invention]

As so far described, the dispenser for a liquid crystal display panel in accordance with the embodiment of the present invention has the following advantages.

That is, for example, because the plurality of syringes are provided at each of the plurality of the dispensing units corresponding to the number of image display parts formed on the substrate, even if the number of the image display parts formed on the substrate increases, seal patterns may be quickly formed, and even in the case of dropping

liquid crystal or forming the Ag dot, the process can be promptly performed, thereby enhancing productivity.

In addition, because the plurality of syringes are provided at each of the plurality of dispensing units and fabricated to be movable corresponding to the size of a small liquid crystal display panel, seal patterns can be formed suitably corresponding to the size of the small liquid crystal display panel, and the dispenser of the present invention may be also used for the case of dropping liquid crystal or forming the Ag dot on the small liquid crystal display panel.

What is claimed is:

1. A dispenser for a liquid crystal display panel, comprising:

a substrate with a plurality of image display parts formed thereon;

at least one dispensing unit supplying a dispensing material on the substrate;

at least one support aligning and fixing the dispensing unit; and

a plurality of syringes separately mounted on the dispensing unit.

2. The dispenser of claim 1, wherein at least one thin film transistor array substrate is formed on the substrate.

3. The dispenser of claim 1, wherein at least one color filter substrate is formed on the substrate.

4. The dispenser of claim 1, wherein the dispensing material is sealant for forming a seal pattern.

5. The dispenser of claim 4, wherein the seal pattern is opened at one portion.

6. The dispenser of claim 4, wherein the seal pattern is a closed pattern encompassing an outer edge of the image display part.

7. The dispenser of claim 1, wherein the dispensing material is liquid crystal.

8. The dispenser of claim 1, wherein the dispensing material is Ag (silver).

9. The dispenser of claim 1, wherein at least one dispensing unit includes a gap controller for controlling a gap between the substrate and the syringes.

10. The dispenser of claim 1, wherein the number of plurality of syringes provided at at least one dispensing unit correspond to the number of image display parts formed on the substrate.

11. The dispenser of claim 1, wherein the plurality of syringes provided at at least one dispensing unit are movable at least one direction of the dispensing unit.

12. The dispenser of claim 1, wherein at least one of the plurality of syringes provided at at least one dispensing unit is fixed at the dispensing unit and the others are movable at least in one direction of the dispensing unit.